Exploring the role of cognitions in addiction research: The example of alcohol

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I HAVE ALWAYS BELIEVED that conferencing is very important in any academics' life, including postgraduate students. I have been attending the BPS-DHP conferences for the past three years which were held in St. Andrews, Sheffield and most recently in Stafford. I have gained a lot from those conferences in terms of new knowledge, networking and experience of presenting to a big audience. However, going back to DHP conference every year made me realise that either my research area does not really fall into health psychology arena (it is more cognitive oriented) or DHP conferences are limited in the range of themes they cover in the scientific programme.

My PhD research is about implicit and explicit cognitive processing in addiction, mainly drinking and cigarette smoking. We all know what health psychology is and what areas of research it covers. Even though addiction is one of those areas, I believe it is not covered sufficiently in conferences. Moreover, I think there is too little on the role of psychology, especially cognitions in addictions. Similar to exercising, healthy infant feeding or adherence to drug medication, drinking and smoking are also health behaviours that need to be addressed more in DHP conferences.

I see this article as a good opportunity to possibly illustrate the vital role cognitions play in acquisition and maintenance of addiction as well as the usefulness of implicit measures in understanding cognitions related to addictions. I will focus only on drinking behaviour and will try to show that understanding cognitions may explain why only some drinkers become addicted and why they relapse even after long periods of abstinence.

First of all, it is important to understand what addiction is. Addiction is a term used to describe a person's physical and psychological dependency on an activity, drink or drug, which is beyond conscious control. Addiction is said to occur when there is a strong desire to engage in the particular behaviour, an impaired capacity to control the behaviour, discomfort and/or distress when the behaviour is prevented or ceased and persistence of the behaviour despite clear evidence that it is leading to problems and harming the person (Gossop, 1989).

Many models and theories have been developed to attempt to understand and explain the mechanisms underlying addictions and addictive behaviours. In recent years, cognitive concepts such as expectancies, memory, attention and automaticity have become popular in understanding addiction (Tiffany, 1999). Researchers in the field have increasingly started to use these concepts to take a cognitive approach to the problem of addiction. This cognitive move towards addiction has led to the emergence of cognitive models of addiction. Cognitive model is associated to health psychology as the specialty of health psychology applies scientific knowledge of the interrelationships among behavioural,

emotional, biological, social and cognitive components in health and disease to the promotion and maintenance of health.

Tiffany's (1990) *Cognitive Model of Drug Urges and Drug Use Behaviour* suggested that alcohol use is largely controlled by automatic processes in problem drinkers. Tiffany proposed several properties as key features of automatic processing. These are speed, autonomy or being stimulus bound, lack of control, effortlessness and being without conscious awareness (Tiffany, 1990; Tiffany & Conklin, 2000). Many of the actions of a problem drinker may be viewed as examples of the kinds of behaviour exhibited by an automatised skill (Tiffany & Carter, 1998). That is, after repeated practice, the alcohol consumption of a problem drinker can be seen as stimulus bound, difficult to control, effortless and without awareness. A number of studies have supported this idea that cognitive biases regarding addictive behaviours may operate at an automatic level (Tiffany, 1990, 1995; Sayette, 1999; Stormark *et al.*, 2000; McCusker, 2001; Sharma, Albery & Cook, 2001). Thus, several paradigms have been used to tap into automaticity in cognitions. One of the paradigms that use automatic processing is the Stroop task. The Stroop task is a case of automatic processing because it indicates that we are reading a word even if it is not part of the task requirements. In recent years, the Stroop task has been modified to investigate the processing of concern related stimuli.

The tendency to attend to some stimuli more than others has been termed attentional bias, and recent cognitive theories of addiction support the idea of an attentional bias in alcohol-related stimuli (Waters & Feyerabend, 2000; Lubman *et al.*, 2000). Attentional biases might be important in alcohol addiction for several reasons. First of all, as addicts become aware of alcohol-related stimuli in their environment, it will be more difficult for them when they are trying to abstain. Secondly, processing of such alcohol-related information may increase alcohol use, and furthermore attentional bias may disrupt mood and cognitive performance and interfere with daily activities (Waters & Feyerabend, 2000). Various attentional-bias paradigms have been used to study alcoholics' processing of alcohol-related stimuli, and one paradigm that has played a most important theoretical role in the study of attention is the modified Stroop task (Cohen, Dunbar & McClelland, 1990; MacLeod, 1991; Johnsen *et al.*, 1994; Stetter *et al.*, 1994; McKenna & Sharma, 1995; Bauer & Cox, 1998; Cox *et al.*, 1999; Stormark *et al.*, 2000; Sharma, Albery & Cook, 2001).

The Stroop task has been very successful in addressing the conflict between automatic and controlled processes. In these studies participants are asked to name the colour of the ink a word is presented in and ignore the meaning of the word. When the word itself conflicts with the colour, most subjects react slower and have more inaccurate responses compared to when the word meaning does not conflict with the colour. More recent studies have shown that participants are slower to colour-name words related to their pathology (Williams, Mathews & MacLeod, 1996). Spider phobics took longer to ink name spider words (crawly, hairy) than generally negative words (Foa, Feske, Murdock, Kozak & McCarthy, 1991). Rape victims show disruption when ink naming rape-related words (Cassiday, McNally & Zeitlin, 1992). Vietnam veterans with PTSD showed disruption to Vietnam War related words (McNally, English & Lipke, 1993). The same effect has been found in studies with problem drinkers (Stetter *et al.*, 1994; Stormark *et al.*, 2000; McCusker, 2001). All these studies used a modified version of the Stroop using alcohol-related (emotional) and/or alcohol-unrelated (neutral) words. The results

have shown that when presented with stimuli associated with alcohol (e.g. beer, pub etc.), problem drinkers showed longer colour-naming reaction times, even though they were instructed to ignore the words themselves and respond only to the ink colour. Taken together, alcoholics' attention is biased toward alcohol-related stimuli, and Stetter *et al.* (1995) and Sharma *et al.* (2001) have argued that this effect is because of the automatic activation of a semantic network related to alcohol inherent among problem drinkers.

I was interested in applying the Stroop paradigm to the alcohol expectancies people have. Alcohol outcome expectancies play an essential role in explaining individual's decision to drink or restrain. Thus, the modification of alcohol outcome expectancies is an important part of treatment approaches to alcohol dependence (Lee, Greely & Oei, 1999), and the Stroop task is one way of modifying alcohol expectancies implicitly.

Alcohol motivations have begun to play an increasingly prominent role in understanding the variability in alcohol consumption and treatment and 'Expectancy Theory' is part of the interest in alcohol motivations (Jones, Corbin & Fromme, 2001). Expectancy Theory postulates that behaviour is explained by individuals having expectations of particular reinforcing effects as the outcome of performing that behaviour. This theory has a social learning perspective and according to this model, alcohol consumption is explained by individuals having alcohol outcome expectations and consuming alcohol in a way that delivers the effect they expect. This is more properly named as Expectancy Outcome Theory and it is a motivational model that is cognitively generated.

One of the central constructs in cognitive and social learning models of alcohol use is the construct of *alcohol outcome expectancies* (AOEs) (Palfai & Wood, 2001). In general, the term alcohol

expectancies refer to expectations an individual holds regarding the outcomes of alcohol use. In other words, alcohol outcome expectancies are the subjective beliefs about the psychological and physical effects of alcohol consumption. According to Expectancy Theory beliefs about alcohol expectancies develop in childhood and influence the decision whether to drink and how to drink throughout the lifetime (Young & Oei, 1993).

Different individuals drink differently both in terms of style and quantity, and individuals hold different outcome expectancies when they consume alcohol. People who drink might have positive or negative alcohol outcome expectancies, or they might have both at different points in time. Positive expectations represent an important component of motivation to drink (e.g. I will enjoy myself more at the party if I have few drinks), whereas negative expectations represent an important component of motivation to restrain (e.g. I will have a hangover if I have few drinks) (Jones, Corbin & Fromme, 2001). Different alcohol expectancies have been found to be closely associated with different consumption patterns in adults (Lee & Oei, 1993) and to predict future consumption patterns in adolescents (Christiansen, Smith, Roehling & Goldman, 1989). The evidence suggests that heavy drinkers have more positive alcohol outcome expectancies, whereas light drinkers have more negative alcohol outcome expectancies (Baldwin, Oei & Young, 1993; McMahon, Jones & O'Donnell, 1994; Lee, Greely & Oei, 1999; Jones, Corbin & Fromme, 2001). The extent to which the behavioural schema for drinking is activated depends on the combination of facilitative and inhibitory effects from activating positive and negative expectancy outcome stimuli. The facilitation and inhibition effects occur differently depending on the amount and frequency of alcohol being consumed and

the outcome expectancies being hold. That is why it is also interesting to see how problem and non-problem drinkers differ in showing facilitation and inhibition effects for positive and negative expectancy words. This is another area I am currently doing research in.

Alcohol Expectancy Questionnaire (AEQ – Brown, Christiansen & Goldman, 1987) and Negative Alcohol Expectancy Questionnaire (NAEQ – McMahon & Jones, 1993) have been developed and used to measure alcohol outcome expectancies. All the findings from studies using the AEQ and/or NAEQ help to understand cognitive motivations for drinking, and the differences between different sets of individuals with different sets of expectancies. However, those studies rely on self-report data which can not be considered to be entirely objective (Carter, McNair, Corbin & Black, 1998). More recent studies have shown that the link between cognitions related to alcohol outcomes and drinking behaviour can be shown without relying on self-reported expectancies (Carter, McNair, Corbin & Black, 1998). Studies suggesting that an alcohol expectancy memory system can be implicitly assessed are available (Weingardt, Stacy & Leigh, 1996; Roehrich & Goldman, 1995; Palfai & Wood, 2001; Jones, Corbin & Fromme, 2001). One of the mostly used methods to measure cognitions at an implicit level has been implicit priming. Implicit priming occurs when the preceding stimulus is presented in a manner that minimises the participant's awareness of that stimulus or its connection to the later response (Roehrich & Goldman, 1995). The memory processes involved in priming are automatic, and when potentially positive/negative outcomes of alcohol use are cued or prompted, cognitions related to alcohol use, among heavy drinkers, becomes activated and more easily accessible in their memory (Weingardt, Stacy & Leigh, 1996).

Several studies have attempted to study the effects of priming positive and negative expectancy outcomes on the drinking responses, (mostly by the Stroop paradigm) as well as assessing the explicit expectancy outcomes by questionnaire (Weingardt, Stacy & Leigh, 1996; Roehrich & Goldman, 1995; Stein, Goldman & Del Boca, 1997 as cited in Jones, Corbin & Fromme, 2001; Carter, McNair, Corbin & Black, 1998). Three of these studies used a modified Stroop task to activate alcohol expectancies through the presentation of an alcohol expectancy network of related words. Roehrich and Goldman (1995) found that individuals who were primed with positive expectancy-related words consumed more alcohol than did individuals presented with neutral words. Carter *et al.* (1998) also found greater alcohol consumption in a group of individuals who were primed with positive alcohol-related words, and significantly less consumption for individuals who were primed with negative alcohol-related words.

The results of those studies support the view that the Stroop measure and alcohol expectancy questionnaires (AEQ and NAEQ) might be tapping different aspects of expectancy process (Stacy, 1997; Palfai & Wood, 2001), and that an implicit measure – such as Stroop task – might provide a more direct and objective method of assessing memory processes involved in the expectancy-drinking association than traditional questionnaire measures.

The Stroop task is only one of the implicit measures that can be used in understanding implicit cognitive processing. Apart from these, there are other measurements that I have used in my studies, such as the Implicit Association Task (IAT – Greenwald, McGhee & Schwartz, 1998) and the Go/No-Go Association Task (GNAT – Nosek & Banaji, 2001), as well as the dot-probe task (Bradley, Mogg & Lee, 1997). The outcome expectancy paradigm is also

only one area that is vital to investigate. Some others that I have done research on are implicit vs. explicit attitudes towards drinking and implicit validation of Alcohol Problems Questionnaire (APQ – Drummond, 1990).

I have tried to summarise the research on cognitive processing in addiction that I am currently involved in and how this might be related to understanding, prevention and treatment of addictions.

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